

**ABSTRACT OF THE DISCLOSURE**

A lab-scale reactor unit comprises a body of thermal insulating material, a reaction chamber formed within the body of thermal insulating material, a pressure containment vessel disposed about the body of thermal insulating material, the pressure containment vessel having an inlet communicating with the reaction chamber, the pressure containment vessel having an outlet communicating with the reaction chamber and a quench cooler operatively connected to the outlet of the pressure containment vessel.